

## For general information about plague

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## For local information about plague



# A QUICK GUIDE TO PLAGUE



Prairie dogs can harbor fleas infected with plague bacteria.



DEPARTMENT OF HEALTH & HUMAN SERVICES

## What Is Plague?

Plague is an infectious disease of animals and humans caused by a bacterium named *Yersinia pestis*. People usually get plague from being bitten by a rodent flea that is carrying the plague bacterium or by handling an infected animal. Millions of people in Europe died from plague in the Middle Ages, when human homes and places of work were inhabited by flea-infested rats. Today, modern antibiotics are effective against plague, but if an infected person is not treated promptly, the disease is likely to cause severe illness or death.

## Where Is Plague Found?

Wild rodents in certain rural areas around the world are infected with plague. Outbreaks of human plague still occur in rural communities or in cities. They are usually associated with infected rats and rat fleas that live in the home. In the United States, the last urban plague epidemic occurred in Los Angeles in 1924–1925. Since then, human plague in the United States has occurred as mostly scattered cases in rural areas (an average of 10 to 15 persons each year). Globally, the World Health Organization reports 1,000 to 3,000 cases of plague every year.

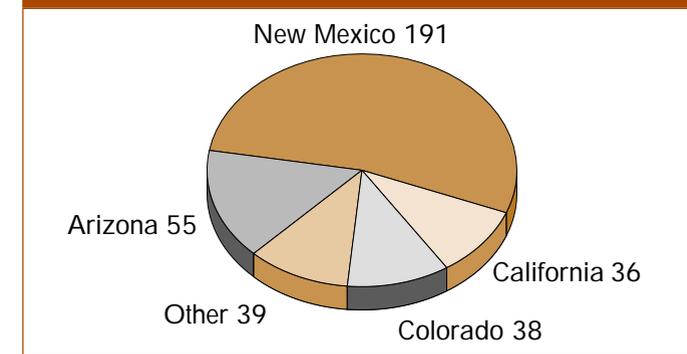
World Distribution of Plague, 1998



Regions where plague occurs in animals

In North America, plague is found in certain animals and in their fleas from the Pacific Coast to the Great Plains, and from southwestern Canada to Mexico. Most human cases in the United States occur in two regions: 1) northern New Mexico, northern Arizona, and southern Colorado; and 2) California, southern Oregon, and far western Nevada. Plague also exists in Africa, Asia, and South America (see map).

Plague in the United States, 1970–1998

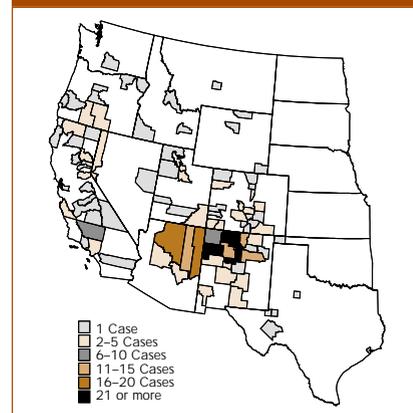


## How Is Plague Transmitted?

Plague is usually transmitted to humans by the bites of infected rodent fleas. During rodent plague outbreaks, many animals die and their hungry fleas seek other sources of blood to survive.

Persons and animals that visit or live in places where rodents have recently died from plague risk getting the disease from flea bites. Persons also can become directly infected through handling infected rodents, rabbits, or wild carnivores that prey on these animals, when plague bacteria enter through breaks in the person's skin. House cats also

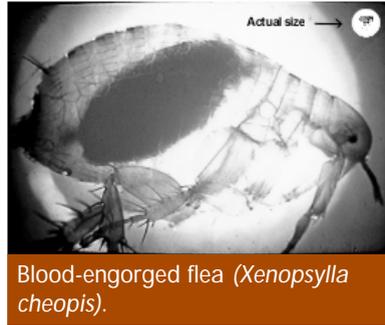
Reported Human Plague Cases by County: U.S., 1970–1997



are susceptible to plague. Infected cats become sick and may directly transmit plague to persons who handle or care for them. Also, dogs and cats may bring plague-infected fleas into the home. Inhaling droplets expelled by the coughing of a plague-infected person or animal (especially house cats) can result in plague of the lungs (plague pneumonia). Transmission of plague pneumonia from person to person is uncommon but sometimes results in dangerous epidemics that can quickly spread.

## How Is Plague Diagnosed?

The typical sign of the most common form of human plague is a swollen and very tender lymph gland, accompanied by pain. The swollen gland is called a “bubo” (that’s where the term “bubonic plague” comes from). Bubonic plague should be suspected when a person develops a swollen gland, fever, chills, headache, and extreme exhaustion, and has a history of possible exposure to infected rodents, rabbits, cats, or fleas. A person usually becomes ill with bubonic plague 2 to 6 days after being infected.



Blood-engorged flea (*Xenopsylla cheopis*).

When bubonic plague is left untreated, plague bacteria can invade the bloodstream. As the plague bacteria multiply in the bloodstream, they spread rapidly throughout the body and cause a severe and often fatal condition. Infection of the lungs with the plague bacterium causes the pneumonic form of plague, a severe respiratory illness. The infected person may experience high fever, chills, cough, and breathing difficulty and may expel bloody sputum. If plague patients are not given specific antibiotic therapy, the disease can progress rapidly to death. About 14% (1 in 7) of all plague cases in the United States are fatal.

## How Is Plague Treated?



Swollen lymph glands caused by plague bacteria (bubonic plague).

A patient diagnosed with suspected plague should be hospitalized and medically isolated. Laboratory tests should be done, including blood cultures for plague bacteria and microscopic examination of lymph gland, blood, and

sputum samples. Antibiotic treatment should begin as soon as possible after laboratory specimens are taken. Streptomycin is the antibiotic of choice. Gentamicin is used when streptomycin is not available. Tetracyclines and chloramphenicol are also effective. Persons who have been in close contact with a plague patient, particularly a patient with plague pneumonia, should be identified and evaluated. The U.S. Public Health Service requires that all cases of suspected plague be reported immediately to local and state health departments and that the diagnosis be confirmed by CDC. As required by the International Health Regulations, CDC reports all U.S. plague cases to the World Health Organization.

## How Can Plague Be Prevented?

Attempts to eliminate fleas and wild rodents from the natural environment in plague-infected areas are impractical. However, controlling rodents and their fleas around places where people live, work, and play is very important in preventing human disease. Therefore, preventive measures are directed toward reducing the risk of human plague infection in those home, work, and recreational settings where the risk of acquiring plague is high.

A combined approach using the following methods is recommended:

- 1) managing the environment;
- 2) educating the public on ways to prevent plague exposures;
- 3) preventive antibiotic therapy; and, rarely,
- 4) vaccines.



To protect against possible hantavirus infection, scientists wear protective suits when examining a mouse with fleas that can harbor plague bacteria.

## ENVIRONMENTAL MANAGEMENT

Effective environmental management of plague reduces the risk of persons being bitten by infectious fleas of rodents and other animals. Preventing plague outbreaks requires sanitation measures to reduce rat and other rodent populations in places where people live, work, and play. It is important to reduce food sources used by rodents and to make homes, buildings, warehouses, or feed sheds rodent-proof. Applying chemicals that kill fleas and rodents is effective but should only be done by trained professionals. Rats that inhabit ships and docks should also be controlled by trained professionals who can inspect and, if necessary, fumigate cargoes.

## PUBLIC HEALTH EDUCATION

In the western United States, where plague is widespread in wild rodents, people living, working, or playing where the infection is active face the greatest threat. Educating the general public and the medical community about how to avoid exposure to disease-bearing animals and their fleas is very important and should include the following preventive recommendations:

- 1 Watch for plague activity in rodent populations where plague is known to occur. Report any observations of sick or dead animals to the local health department or law enforcement officials.
- 2 Eliminate sources of food and nesting places for rodents around homes, work places, and recreation areas; remove brush, rock piles, junk, cluttered firewood, and potential

food supplies, such as pet and wild animal food. Make your home and outbuildings rodent-proof.

3 If you anticipate being exposed to rodent fleas, apply insect repellents to clothing and skin, according to label instructions, to prevent flea bites. Wear gloves when handling potentially infected animals.

4 If you live in areas where rodent plague occurs, treat pet dogs and cats for flea control regularly and do not allow these animals to roam freely.

5 Health authorities may use appropriate chemicals to kill fleas at selected sites during animal plague outbreaks.



Cats with plague can pass the disease to their owners.

## PROPHYLACTIC ANTIBIOTICS

Medical experts advise that antibiotics be given for a brief period to people who have been exposed to the bites of rodent fleas during a plague outbreak or have handled an animal infected with the plague bacterium. Such experts also recommend that antibiotics be given if a person has been exposed to another person or to an animal (for example, a house cat) with suspected plague pneumonia.

Persons who must be present in an area where a plague outbreak is occurring can protect themselves for 2 to 3 weeks by taking antibiotics. The preferred antibiotics for preventing plague are the tetracyclines or the sulfonamides.

## VACCINES

Plague vaccine has very limited use. The following persons should consider vaccination: 1) scientists who work with the plague bacterium in the laboratory; and 2) people in plague-infested areas who handle or have close contact with potentially infected animals as part of their routine work (such as rodent biologists).